
**WOOD HEATING
IN FORT SEVERN, ONT.**

WOOD HEATING IN FORT SEVERN, ONT.

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For:

Remote Community Demonstration Program
of Energy, Mines and Resources Canada

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WOOD HEATING IN FORT SEVERN, ONTARIO

Executive Summary

Fort Severn, the most northerly community in Ontario, is a village where every native home is heated 100% by a wood stove.

Energy, Mines and Resources Canada (EMR) hired wood heating expert Cal Wallis to inspect the heating systems in several Fort Severn homes January 21-23, 1986. The Fort Severn Band was in favour of the heating inspections. Afterwards, Wallis spoke at a public meeting and on the community radio station. He also met with the heads of the carpentry and renovation crews.

Wallis concluded that the people burn wood as well as can be expected, but the quality of appliances and safety of the systems are somewhat questionable. He strongly recommends training and certification for the Band carpentry crew so members can become installation experts.

The potentially most dangerous aspect of wood heating is the improper installation of the stove, chimney, pipes and shields. Wallis found that the chimneys in Fort Severn seem to be installed according to manufacturers' suggestions, with one exception: the clearance around the chimney as it passes through the roof was inadequate. Most of the stoves were installed closer to a combustible wall than their certification allows. Band members may have thought they were protected by the asbestos heat shields they put on the closest wall to the stove, but the asbestos is no protection at all. None of the homes had the required 18-inch protection in front of the stoves. This means an ash or coal spillage could lead to problems.

Wallis acknowledges the difficulty in finding a new supplier, but nevertheless advises the Band to buy different types of stoves and chimneys. In particular, he recommends:

1. Stoves

The Ban' should buy better, more efficient, controllable stoves capable of burning very hot wood year-round. One good source of information on stoves is EMR's "Billpayers' Guide to Home Heating Systems". Perhaps the Band could establish a way of claiming under the warranty for stove parts which break or malfunction. The Hudson's Bay stores should be encouraged to stock items needed by the community, such as replacement gaskets, gasket adhesive, firebricks for stove repairs, and inspection wraps for smoke pipe to chimney connections. In addition to increasing safety, an increase in stove efficiency would dramatically reduce the time and fuel needed for wood gathering and would improve the local air quality.

2. Chimneys

The Band should buy chimneys which are easier to install. Any brand of S629 chimney other than the model now used (Selkirk Sentinel) would be easier to install and cost less. The Band should buy chimney cleaning equipment (there is none in the community) for loan to individuals. Inspection wraps for smoke pipe to chimney connections make it easier both to connect the stove and to clean the chimney. One of these wraps should be bought for each new chimney system and some extras could be bought to fix existing systems.

3. Installations

The carpenters need sheet metal for floor and wall shields. They also need two hand crimpers to reverse smoke pipe and prevent sparks escaping into the room between pipe joints. A technical advisor the Band could call on would also be useful. A certification training program, such as the Canadian Standards Association B601 course, would be appropriate.

3. Standard

The Province of Ontario should make known to the head carpenter and Band leaders the recent changes in the provincial building code on wood heating. The CSA B365 M1984 standard should be provided to the Band for reference and daily use by the carpenters. The Band should keep owners' manuals from all newly purchased stoves.

5. Public Presentations

Until equipment and installations improve, there is no point in holding public meetings on woodburning. (The carpentry crew does all the installations). There is little to say about safer wood burning and translation into Cree of such a technical subject is extremely difficult.

6. Field Experiment

Two different stove brands should be evaluated in Fort Severn. Both should be horizontal baffle or sidecraft design, one of heavy plate steel and the other of cast iron. However, Wallis points out that these stoves are rare, since the industry is now making fireview, glass-door models which usually cost more and have no advantages for a community such as Fort Severn.

CHAUFFAGE AU BOIS À FORT SEVERN, ONTARIO

Résumé

À Fort Severn, la collectivité la plus au nord de l'Ontario, le chauffage de chaque maison est assuré exclusivement au moyen de poêle à bois.

Énergie, Mines et Ressources Canada (EMR) a engagé un spécialiste du chauffage au bois, Cal Wallis, afin d'inspecter, du 21 au 23 janvier 1986, les systèmes de chauffage utilisés dans plusieurs maisons de Fort Severn. La bande d'indiens de Fort Severn a approuvé le projet d'inspection des systèmes de chauffage. Par la suite, Wallis s'est adressé aux membres au cours d'une réunion publique et en utilisant le poste de radio communautaire. Il a également rencontré des chefs des équipes chargées des travaux de charpenterie et de rénovation.

Wallis conclut que les gens utilisent bien entendu du bois comme combustible mais que la qualité des appareils et la sécurité des systèmes laissent à désirer; il recommande fortement d'offrir à l'équipe de charpenterie de la bande des cours de formation pour en faire des spécialistes dans l'installation de système de chauffage et de leur délivrer des certificats d'attestation.

L'aspect le plus dangereux du chauffage au bois réside dans l'installation incorrecte d'une poêle, d'une cheminée, de tuyaux, d'écrans protecteurs. Wallis a constaté au cours de l'inspection faite à Fort Severn, que les cheminées semblent être installées selon les recommandations du fabricant, à une seule exception près. Il a remarqué un cas où l'espace prévu entre la cheminée et le bois, là où elle passe à travers le toit, était suffisant. La plupart des poêles ont été installés plus près que recommandé d'un mur fait de matériaux inflammables. Les membres de la bande ont pu croire que la pose de boucliers protecteurs d'amiante sur le mur le plus près du poêle suffit pour prévenir l'inflammation des murs alors que l'amiante n'offre aucune protection du genre. Wallis n'a trouvé, dans aucune maison, de dispositifs quelconque de protection d'au moins dix-huit pouces à l'avant du poêle ce qui signifie que le débordement de cendres ou du charbon peut causer des problèmes.

Wallis reconnaît qu'il est difficile de trouver un nouveau fournisseur mais conseille néanmoins à la bande d'acheter différents modèles des poêles et de cheminées. Ses recommandations portent, en particulier, sur les points suivants:

1. Les poêles

La bande doit acheter des poêles plus efficaces, dont le tirage peut être contrôlé et permettant de brûler du bois à l'année longue et de maintenir un feu très intense. Les publications d'EMR, "Payer moins et chauffer mieux" ou "les systèmes de chauffage domiciliaires" constituent une bonne source d'information sur les poêles à bois. La bande devrait peut-être établir une façon de procéder afin de présenter des réclamations dans le cas de bris ou de défauts de pièces de poêles à bois qui sont encore couverts par une garantie. Il faudrait peut-être encourager les magasins de Hudson Bay à garder en entrepôt les articles nécessaires à la collectivité notamment des joints de rechange, des adhésifs de joints, des briques réflectaires utilisées pour la réparation des poêles, et des raccords de tuyaux aux cheminées. Outre d'améliorer l'aspect sécuritaire, l'accroissement du rendement des poêles permettrait de réduire sensiblement le temps consacré à la préparation du bois de chauffage, la consommation carburant utilisé à ces fins et d'améliorer la qualité de l'air du milieu ambiant.

2. Cheminées

La bande devrait acheter des cheminées dont l'installation est plus facile. Toute cheminée de marque S629 autre que le modèle actuellement utilisé (Selkirk Sentinel) serait plus facile à installer et coûterait moins cher. La bande devrait acheter de l'équipement de nettoyage de cheminée (la collectivité n'en dispose d'aucun) pour le prêter aux différents membres. Les raccords de tuyaux aux cheminées facilitent l'installation des poêles et le nettoyage des cheminées. Il faudrait en acheter pour chaque nouveau système de cheminée en prévoir un certain nombre supplémentaire pour les installer sur les systèmes existants.

3. Installations

Les charpentiers ont besoin de feuilles de métal servant d'écran protecteur des planchers, des murs. Ils ont également besoin de deux pinces à sertir afin de modifier les rebords des tuyaux pour empêcher que des étincelles puissent être projetées dans la pièce à partir d'ouvertures se trouvant dans des joints des tuyaux. La bande pourrait faire appel aux services d'un conseiller technique ce qui lui serait utile. Il serait de circonstance d'offrir aux membres un programme de formation donnant lieu à la délivrance d'un certificat d'attestation notamment le cours B601 de l'Association canadienne de normalisation.

4. Normes

La province de l'Ontario devrait informer le charpentier en chef et les dirigeants de la bande des récents changements apportés au code provincial du bâtiment en ce qui concerne le chauffage au bois. Une copie de la norme CN B365 M1984 devrait être remise à la bande aux fins de référence; les charpentiers pourraient également la consulter chaque jour. La bande devrait conserver les manuels du propriétaire qui sont fournis avec tous les nouveaux poêles.

5. Présentations publiques

Tant que l'équipement et les installations n'auront pas été améliorés, il n'y a pas lieu de tenir de réunions publiques sur le chauffage au bois (l'équipe de charpentiers s'occupe de toutes les installations). Il y a peu à dire sur la sécurité des systèmes de chauffage au bois et il serait très difficile de traduire en Cree de l'information sur un tel sujet technique.

6. Expérience sur le terrain

Deux modèles différents de poêle à bois devraient être mis à l'essai à Fort Severn. Ils devraient être équipés de déflecteurs horizontaux ou d'un dispositif permettant dans le passage d'air par le côté, l'un fait d'une plaque d'acier et l'autre d'une plaque de fonte. Cependant, comme Wallis le fait remarquer, ces modèles sont rares et puisque l'industrie fabrique maintenant des poêles équipés de portes vitrées donnant vue sur les flammes, ces nouveaux modèles coûtent beaucoup plus cher et n'offrent aucun avantage à une collectivité comme celle de Fort Severn.



WOOD HEATING IN FORT SEVERN

1.0 An Overview

Fort Severn - the most northerly community in Ontario - is a village where every native home is heated 100% with a wood stove. The stoves and chimney systems are bought by the Fort Severn Band through CMHC.

I visited Fort Severn on January 21st through to the 23rd, 1986. At this time I inspected several homes as part of an Energy Audit team from Scanada Consultants Ltd., Keewatin-Aski Ltd., and the Toronto CREO (Conservation and Renewable Energy Office of Energy, Mines and Resources Canada). After visiting the homes, I spoke at a public meeting held at the school during the evening and on the community radio station. The heads of the carpentry and renovation crews met with me one day and seemed very interested in the changes I suggested to their wood stove installation techniques.

There is a general similarity among all the installations since the houses, stoves and chimneys are designed and purchased centrally. The same crew installs them as well, so they tend to be of the same quality. The chimneys are ceiling supported, interior, metal insulated types. The older houses have 7" A Vent chimneys and newer or newly renovated houses have 6" ULC S629 types. The stove is usually situated immediately beneath the chimney against a wall on either a tin floor protector or 4-inch cement blocks lying on their side. Single wall black smoke pipe joins the chimney to the stove.

Wood is supplied by each individual for his home. Softwood is the only type available and it is brought quite a distance by snowmobile. Consumption of wood is relatively high but every home we visited was very warm - certainly closer to overheated than to cool.

People are generally happy with their heating system. It is no doubt an improvement over the older non-airtight models but it is far below current average state of the art.

These people are getting along fine with their stoves now but the future is uncertain in a number of ways.

1.1 Stoves

The wood stoves the Band uses are of a simple updraft design. One of the newer models had a tiny (approx. 4" x 6") smoke baffle below the outlet and one was a side draft type. Interestingly, this latter stove has a village reputation as "holding a fire for 18 hours" and "burning 8 logs a day". Energy, Mines and Resources Canada in its publication "Billpayers' Guide to Home Heating Systems" shows a graph where the updraft style of stove runs almost 15% less efficiently than other types. This efficiency is far from a theoretical problem. In Fort Severn, wood availability is a major issue. An increase in appliance efficiency could dramatically reduce the amount of time and fuel devoted to wood gathering, as well as conserve the wood supply and improve local air quality.

The stoves in use in Fort Severn are constructed of sheet metal which has warped in all the stoves I looked at which were more than two years old. The door assembly is not adjustable for tightness, causing air leakage. This means that the stoves are basically uncontrollable in lower settings and further ensured that they go out over night, making the houses cold. In mild weather, since the stoves are not controllable, the homes get very warm, and the people open the houses' doors to keep comfortable. This is a major waste of wood. In my inspection, at minus 30°C outside, the houses ranged in temperature with 25°C being the norm. If they could maintain 18-20°C without opening the house doors, a lot of wood could be saved.

On my last day I visited two homes with the head carpenter, at his suggestion. Both homes had stoves which needed repair or maintenance. One was a simple maintenance item - new fiberglass door gaskets and adhesive to apply it. I had brought just enough material to do a stove of this size and we repaired it.

Unfortunately, the other stove required more parts and work than we could effect with the stove heating the home. This is a very efficient model - a side draft design, highly recommended by Energy, Mines and Resources Canada's "Billpayers' Guide to Home Heating Systems". I was very disappointed that this particular stove had several warrantable items wrong with it. Both side firebrick retainers had, through heating and cooling, loosened the nuts to the point where the retainers actually fell off into the firebox. The direct damper mechanism had broken its welds and fallen into the secondary combustion chamber. I have no idea how this latter part could be fixed without a welder on site and a man climbing inside the firebox to weld it up again. As a result, this potentially very efficient stove has only a small horizontal baffle to ensure some wood gas combustion, instead of the side draft secondary combustion chamber. I did repair the loading door (and showed the head carpenter how to do it) so that it closes properly and didn't have to be wired shut. However, even with all the above problems this stove has the reputation of "the best" in Fort Severn thus supporting, in the field, Energy, Mines and Resources Canada's claim of higher overall efficiency.

1.2 Chimneys

All the chimneys are ceiling supported, metal prefabricated solid packed, located inside the house except for the roof penetration. This is the best overall type of chimney. The older homes had 7" A Vent chimneys and the newer and retrofitted houses had 6" type ULC S629 chimneys - meeting the new Ontario Building Code. Many A Vent models featured galvanized outer casings suitable for interior use only - but usually five feet of this was exposed above the roof. This is not suitable due to rusting of the outer casing reducing its life. I believe this is caused by a supplier problem - galvanized is perhaps 15-20% cheaper, but is not competitive in quality with stainless steel. Underwriters Laboratory Canada (ULC) has just recently withdrawn certification of all galvanized sections for all wood heating applications.

There was no chimney cleaning equipment available in the community. One of the Band members requested this from us as he needed it in his home.

All the smoke pipe connectors are single wall, requiring 18-inch clearance to combustibles. Each joint in the system should be secured with three sheet metal screws, as well as to the stove. None were used in Fort Severn. A specialized smoke pipe part called an inspection wrap is needed to join a top vented stove straight up to the chimney. The head carpenter requested such a part without even knowing it really existed, because he had a hard time doing his job without it.

1.3 Installations

As in most Ontario communities the single most dangerous aspect of wood heat is the installation of the stove, chimney, pipes and shields.

Chimneys seem to be installed according to the manufacturer's suggestions with one exception. The clearance around the chimney as it passes through the roof is inadequate. In most cases the wood sheathing actually touches the chimney. The minimum clearance for safety is two inches.

Most of the stoves were installed closer to a combustible wall than their certification allows. For example the listing for one common model is 30 inches from the sides and it was often 12-18 inches instead. One reason for this is that the Band has installed asbestos "heat shields" beside the stove on the closest wall to the stove. This 4-foot by 8-foot sheet of asbestos cement board is nailed directly to 2-inch by 4-inch studs. The other side of the wall is usually regular wall panelling. In one case both sides were asbestos but the studs were wood. In another home the wood panelling on the other side of the wall was hot to the touch - well over 150°F. This asbestos on the wall is no shield at all. This is an insidious danger in that it appears to be safe to the average person, certainly to the Band members who trust the shield. In fact, pyrolysis (chemical change brought about by the action of heat) of the studs is occurring through time which can lead to house fires.

There was one case of a shield as described installed where it wasn't needed i.e., 36 inches from the stove, where 30 inches was required; in another case, a 6-inch smoke pipe passed through such a wall into a chimney located in another room.

Floor protection is thicker than is necessary in the case of 4-inch concrete blocks laid on their sides, but does not extend 18 inches in front of the stove. Most were about 6 inches. This could lead to problems in the case of ash or coal spillage.

1.4 Standards

The Ontario Building Code requires that all certified stoves be installed according to their owner's manual. If the manual doesn't cover a particular point (such as reduced clearance wall shielding) the CSA B365 M1984 code is to be followed.

In Fort Severn none of the stoves appeared to come with an owner's manual, but even if they did no Cree translation exists. I introduced the CSA B365 code to not only Fort Severn but also the consulting engineers doing planning in the region.

1.5 Wood Supply

Wood is cut by each individual except in a few cases where people look after older or disabled people. A tiny fraction is sold. All the wood is softwood, usually tamarack cut from beaver floods. It is standing deadwood and therefore drier than other wood. Still, our measurements of wood stored in the house ready to burn indicated 20-28% moisture content, 5-15% more than desirable. However, the softwoods have a great deal of pitch and this hot burning pitch enables the wood to burn fairly easily even though it is quite wet. For these reasons Fort Severn seems to experience few chimney problems. Softwood is very sparky wood and we heard of sparks flying out between pipe joints. Tamarack is well known as "the stove buster" and the stoves in Fort Severn show its harmful effects. The high pitch content ensures very long flames which are similar in heat to that of coal. Although it is a "softwood", slow growth in this region ensures high density relative to southern tamarack. Indeed its performance is not unlike hardwoods.

All the wood comes quite a distance - minimum five miles one way -- from the frozen beaver floods where it is cut. Snowmobiles pull sleighs mounted with boxes measuring 8 feet long, 2 feet wide and 2 feet high. This comes to about one quarter of a cord. Some folks claim to use as much as three loads per week. The time and expense of hauling wood is very high not to mention that the beaver flood wood is being depleted making wood sourcing in the future a potential problem.

The wood piles, where they exist, are either buried in snow or are standing teepees of long poles so that they don't get buried. Only one day's supply of fuel is kept inside, usually right next to the stove on the floor. Wood boxes are not used, and no one stores wood inside.

1.6 Public Presentations

I met with some of the Band leaders. A number of councillors were out of the village and a council meeting was not possible. A public meeting was held at the school one evening. A third meeting was held with the leaders of the carpentry crew. Of these three meetings, the one with the carpentry crew was most fruitful. These men install all the woodburning equipment in every home so improving

their method of installation would have a dramatic effect on overall safety in the community. They appeared to be very interested in learning more and doing better. We went over several specific points in their installations as I pointed out places to improve and they explained their problems with the materials they were given to deal with.

This was a useful meeting as the men were glad to meet someone who had done their job and appreciated its problems.

The public meeting at the school was only sparsely attended in spite of good advertising on the radio station and in posters around the village. Those who did attend were mostly women, who are the "fire-tenders" of the community. Most spoke no English at all. My entire presentation was translated into Cree sentence for sentence. The blackboard was the only visual aid used as I discussed safe firing and loading techniques. Making the installation safer was not a potential topic as all changes would have to be made by the carpentry crew and it appeared that galvanized sheet metal, pipe shields etc, may not be easily available even to them.

Overall the quality of operation was high (much better than in Southern Ontario), due to good interior insulated chimneys and to hot burning wood. This is to say that the operators are doing a good job with what they are given. There is little to offer the people to improve their wood burning habits. Without some basic tools (like thermometers on the smoke pipe or stove surface) it is difficult to describe how hot to operate the stove in warmer weather - a serious problem in Southern Ontario, but a minimal one in Fort Severn. Without chimney brushes there is no point in telling people to clean their chimneys.

One crew installs everything in the home, so that telling the homeowner how to best shield his wall or floor is fruitless. With very hot (although high moisture content) softwood it makes no sense to encourage drier wood. Given the uncontrollability of their stoves, it would be improper to discuss firing and loading cycles, burning of charcoal, etc. In all, it is difficult to offer much to these people that they could use to improve their firing techniques.

Given the above and the difficulty of translating technical subjects into Cree so that they can be understood, it seems to me that public meetings have little use in promoting wood heating efficiency.

1.7 Recommendations

1.7.1 Stoves

- 1) More efficient stoves, as described in Energy, Mines and Resources Canada's "Billpayers' Guide to Home Heating Systems", should be sourced for use in remote areas like Fort Severn.
- 2) Higher quality stoves capable of burning very hot wood year-round should be sourced.

- 3) Stoves which are more controllable in actual use over a longer term should be sourced.
- 4) Perhaps the Band could establish a method of claiming for warranty parts on the stoves which do break or malfunction. Currently they are "rigged up" or thrown out.
- 5) I visited the Hudson's Bay Company and spoke to the manager about stocking some goods requested by the community. These include:
 - 1) 3/8 inch fiberglass gasket for replacement .
 - 2) gasket adhesive
 - 3) firebrick for stove repair
 - 4) inspection wraps for smoke pipe to chimney connections for easier cleaning of the chimney and an alternative method of connecting stoves.

I was told that he could not obtain these through the head office. It would be a good idea to contact Hudsons Bay Company in Pointe Claire, Quebec, regarding stocking of these products, perhaps for the entire northern region. The address is:

Eric Pearson
Hudson's Bay Company
165 Hymus Blvd.
Pointe Claire, Quebec
H9R 1G2
(514) 697-8500

1.7.2 Chimneys

- 1) Chimneys could be sourced from other suppliers which may be easier to install than the current lot of S629 Selkirk Sentinel chimneys, which the carpentry crew found very difficult to install, compared to their experience with A Vent. Any other brand of S629 chimney would be easier to install and cost the Band less.
- 2) Chimney cleaning equipment (one set, and a range of brushes to suit various chimney sizes in the community) could be purchased by the Band for loan to individuals.
- 3) Inspection wraps should be ordered with black pipe purchases in sufficient quantities to install one in each chimney system and perhaps some extras for existing systems to be reinstalled properly.

1.7.3 Installations

- 1) Clearance at roof penetration was less than two inches. I promised to be available for technical assistance through the Ontario CREO office. The Band seemed to like that, but a more formal long-term technical back-up would be good help.

- 2) Additional help is needed to assist in correction of problems with the heat shields. Reinforcement of our seminar and discussions and the "Billpayers' Guide to Home Heating Systems" would help to ensure this is carried out by the carpenters.
- 3) Sheet metal for floor and wall shield should be provided to the carpentry crew.
- 4) The carpenters need two hand crimpers to reverse smoke pipe and prevent sparks escaping into the room between pipe joints. This is the only cure for their sparky wood and gaps in the pipe. Pipes should be screwed together as well.
- 5) A training program (such as CSA B601) would ensure that all installations are up to current standards. Such formalization as certified installers would no doubt sit very well with the leaders of this carpentry crew. If the province adopts this policy, I am sure that these men would enjoy the training and the prestige attendant with such a certificate.

1.7.4 Standards

- 1) The Ontario Building Code needs to promote its recent changes with regard to wood heating to the head carpenter and Band leaders.
- 2) Copies of CSA B365 M1984 should be provided to the Band for reference and daily use by the carpenters.
- 3) Owner's manuals from all newly purchased stoves should be filed for reference by the Band. Perhaps manuals for the existing stoves could be obtained and saved for reference and for helping the individual claim on warranty.

1.7.5 Wood Supply

Since the distance to wood supply is already a problem, the above recommendations regarding efficiency, performance and control of the stoves will help preserve the wood supply for the future.

1.7.6 Public Presentations

Speaking to the general public in this situation has minimal effect at this time. Until equipment and installations improve in Fort Severn it is my recommendation that no public meetings be held about wood burning. There is very little to say about safer wood burning and the translation into Cree of such a technical subject is virtually impossible.

1.7.7 Primary Recommendations

The type of stoves purchased by the Band should be researched better. As I've pointed out, the current models are very

inefficient, hard to control and don't last very long. The problem, apparently, is that the Band purchases its stoves from the building supply company from whom it buys material for the houses.

These suppliers do not know and are not interested in stoves. As a result they sell only the units which are easy to get, from the suppliers they may have purchased from over the past ten to twelve years. These stoves are the most common, old style, inefficient models available in the early 1970's. They are sold without regard to Fort Severn's special conditions i.e., hot tamarack fuel, long burning season, and absolute reliance on the stove to keep warm.

It seemed apparent to me that this purchasing system is costing the Band a lot of money in replacing stoves in two to four years. This does not make economic sense with regard to purchase costs and makes even less sense when the approximately \$1.00 per pound freight costs are included.

My recommendation would be to conduct a field experiment in Fort Severn using two different stove brands. Both should be horizontal baffle or sidedraft design (the more efficient models as described in the "Billpayers' Guide to Home Heating Systems"). One model would be heavy plate steel: I feel that 1/4 inch is mandatory (as apposed to 3/16 inch so readily available in southern Canada). Another model would be constructed of cast iron: a material most suitable for durability over the long term and easily repaired. Each of these stoves would be "box stoves", long narrow stoves with a single loading door in the narrow end.

Unfortunately, at this time, these types of stoves are either rare or non-existent as the stove industry has moved away from these styles to fireview, glass door models generally costing more, with no real features the Band could functionally use.

Should another Remote Community Demonstration Program (RCDP) project be planned for wood burning, I would recommend that the carpentry crew be the primary target for education. Based on what I saw, the people burn wood as well as can be expected, but the quality of appliances and safety of the system is somewhat questionable. The safety of the chimney systems could be corrected quickly if this crew were turned into "experts" through training and certification (ie: CSA B601). Some additional money could be spent to bring existing installations up to code thus improving the overall community fire safety.

2.0 Outline of Presentation

2.1 Stoves

- the community is operating its stoves well; any problems observed through on-site inspection stem from the type of equipment used;
- wall clearances do not meet safety regulations which poses a fire hazard
- the inspection of stoves found:
 - stoves installed less than 36" from the walls
 - incorrectly places heat shields
 - asbestos and/or tin barriers nailed directly to the wall
- asbestos and tin barriers should not be nailed directly onto the wall but should be mounted with a one-inch airspace clearance between them and the wall so that the heat they absorb is not directly transmitted to the wall.
- stoves may be up to 12" from the wall depending on the type of heat shield used
- tin floor shields should also extend 18" in front of the stove to act as spill plates
- a simple test to determine whether or not the stove is too close to the wall is to place your hand palm-down on the wall. If the wall is too hot to leave your hand there comfortably for 15 minutes, the stove is too close and/or shielding is required
- air-tight stoves are the best type of stoves to use as air used for combustion can be regulated; this allows burning rates to vary according to conditions
- door gaskets should be replaced using proper gaskets and gasket cements to ensure the stove is air-tight.

2.2 Chimneys

- chimneys inspected were in good condition but should be:
 - inside the house, metal, well insulated
 - regulation distances from the roof structure (2")
- smoke pipes from the stove to the chimney should be fastened together using three screws, preferably the self-tapping kind. The improper fit of pipes can be corrected using a hammer. If gaps remain and sparks fly out, the gasket seal may be used to seal the joint. An electric drill is useful when using self-tapping screws.

- elbow and/or "T" joints are also a good idea
- in order to facilitate the removal of the smoke pipe, the joint to the chimney should be made using a removable sleeve. A gap is left between the stove pipe and chimney and the sleeve covers this section. To remove it the retaining screw are loosened and it slides down the smoke pipe.

2.3 Operation

- ashes should be placed in metal containers and stored outside to avoid a fire hazard
- it is important to burn dry wood. (Energy is used to evaporate water from wet wood during burning; thus less energy is available to heat the house.)
- it is also important that dry wood be used in warmer weather to prevent creosote deposits from building up in the chimneys. If wet wood must be used, do so during the coldest weather and cut it well in advance.
- the supply of beaver dam wood is good dry wood

2.4 Conclusions

- the main goal of this project is to enable the community to use less wood by learning how to burn the wood more efficiently. Part of burning wood more efficiently involves doing repairs to keep existing equipment in proper condition.
- EMR's "Billpayers Guide to Home Heating Systems" is a good reference, specifically the chapters on heating with wood and chimneys and ventilators
- the problems observed with the present systems stem from the equipment, rather than users
- better stoves, a supply of replacement parts and good instructions are highly recommended.

